

## Module 8: Technologies for Small Urban and Rural Transit Systems

# Module 8

## Technologies for Small Urban and Rural Transit Systems

*Transit Management 8-1*

TRANSIT MANAGEMENT TRAINING ROADMAP	
	Module 1: Introduction to ITS and APTS
	Module 2: Automatic Vehicle Location Systems
	Module 3: Automated Transit Information
	Module 4: Transit Telecommunications
	Module 5: Transit Operations Software
	Module 6: Paratransit Computer-Aided Dispatch
	Module 7: Electronic Fare Payment
<b>Module 8: Technologies for Small Urban and Rural Transit Systems</b>	
	Module 9: Stages of ITS Project Deployment
	Module 10: What Can ITS Do for Me?

### Market Segments

- Self-contained high growth
- Self-contained slow or no growth
- Large sparsely populated
- Rural tourist areas
- Rural to metro communities



## Module 8: Technologies for Small Urban and Rural Transit Systems

### Introduction

Slide: Goal

# Goal

- To provide an overview of how small urban and rural transit agencies are overcoming their unique challenges with ITS

*Transit Management 8-2*

**Module  
objective**

Given an APTS Technology Reference table, students will list three benefits of applying APTS technologies to small urban or rural transit systems.

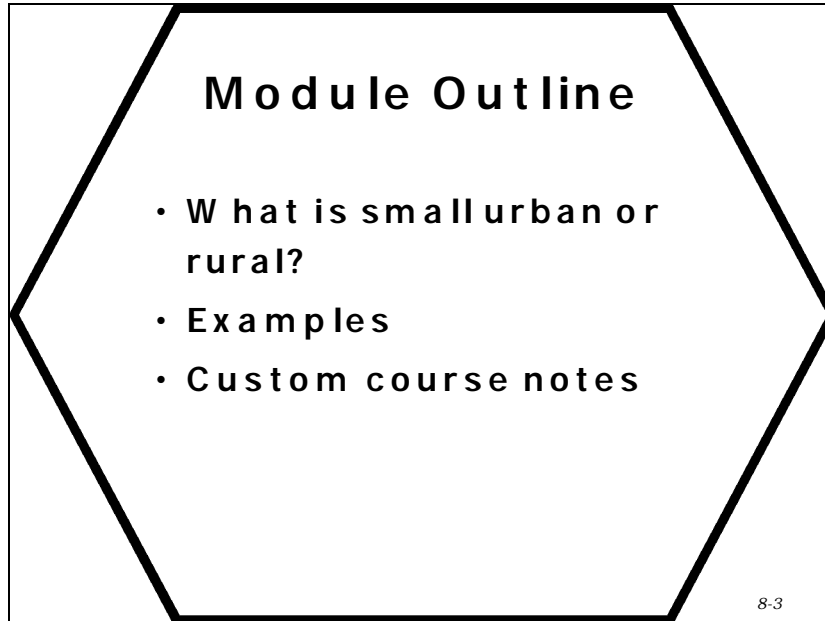
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## Introduction, Continued

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Slide:  
Module Outline



## What Is Small Urban or Rural?

Slide:  
What Is Small  
Urban or  
Rural?

### What Is Small Urban or Rural?

- **Population**
  - **Small Urban:** 50,000 to 200,000
    - 16 % of the population
  - **Rural:** less than 50,000
    - 21% of the population

*Transit Management 8-4*

**Population table** The table below shows the size of population areas according to Section 18 of the Federal Transit Act.

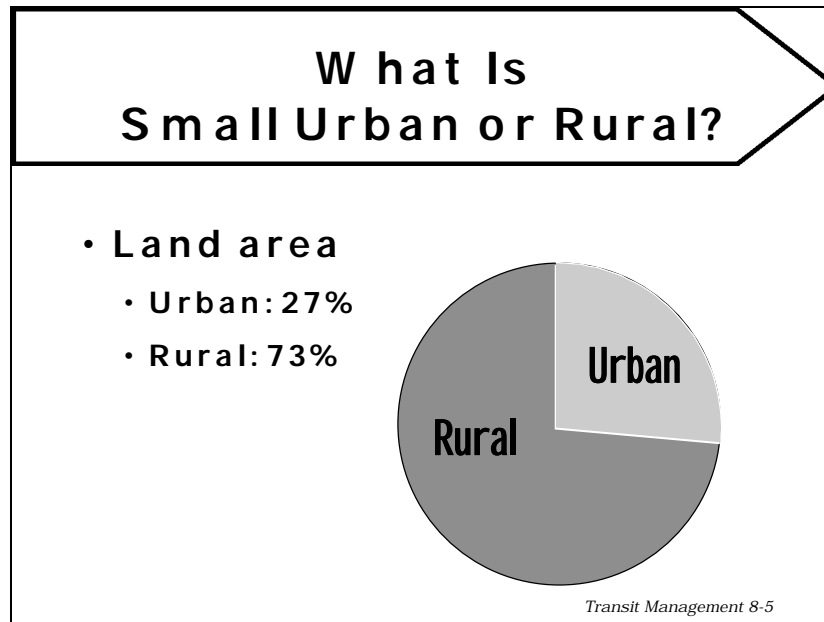
Area	Population
Large-Urban	greater than 1 million
Medium-Urban	200,000 to 1 million
Small-Urban	50,000 to 200,000
Rural	less than 50,000

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## What Is Small Urban or Rural?, Continued

Slide:  
What Is Small  
Urban or  
Rural?



**Small urban vs.  
rural**

According to the Census Bureau:

- Each urbanized area (UA) includes a central city and a surrounding densely settled territory that together have a population of 50,000 or more and a population density of 1,000 people per square mile.
- Everywhere that is not an urbanized area is considered rural.

**Some statistics**

The following table shows some statistics about rural transit service.

Statistics	
<b>Who comprises “rural” residents?</b>	30 million elderly, working poor and people with disabilities
<b>Rural jobs</b>	18% of the nation’s jobs
<b>Rural earnings</b>	13% of the nation’s earnings
<b>Transit Service</b>	38% rural residents lack public transit service
	28% rural residents service is negligible

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## What Is Small Urban or Rural?, Continued

**Slide:**  
**Where to Find**  
**Help**

### Where to Find Help

- Rural Transit Assistance Program (RTAP)
- Community Transportation Association of America (CTAA)
- Advanced Rural Transportation Systems (ARTS) Compendium

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### **Objectives of RTAP**

The objectives of the Rural Transit Assistance Program:

- To promote delivery of safe and effective public transportation in non-urbanized areas
- To foster development of local capacity for addressing the training and technical assistance needs of rural transportation communities
- To facilitate peer-to-peer self help through networks of transit professionals
- To support coordination of public, private, and specialized transportation services
- To develop a national rural public transportation database

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## What Is Small Urban or Rural?, Continued

### Components of RTAP

The program has two components:

- The **state program** provides an annual allocation to each state for training and technical assistance programs in conjunction with the state's administration of 49 USC 5311 (formerly Section 18) formula assistance program.
- The **national program**
  - ◊ provides information and materials for use by local operators and state administering agencies
  - ◊ supports research and technical assistance projects of national interest

### What is community transportation?

Community transportation is a practical alternative that picks up where the private auto and mass transit leave off. It has evolved as an effective network of community-based agencies and coordinated services that:

- offers the elderly access to needed services
- ensures mobility for people with disabilities
- connects the poor and unemployed with jobs and training facilities

For many Americans, community transportation means an opportunity to remain independent and self-sufficient and to fully participate in the community.

- This is the only “public” transportation available in many rural and marginally populated areas.
- These human service agencies comprise the majority of the 1200 agencies providing transportation services to rural areas.

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## What Is Small Urban or Rural?, Continued

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### CTAA Mission Statement

The Community Transportation Association of America (CTAA: [www.ctaa.org](http://www.ctaa.org)) is a national, professional membership association of organizations and individuals committed to achieving these results:

- barriers to isolation and to improving mobility for all people will be removed
- research conducted and technical assistance provided
- educational programs offered
- advocacy in order to make coordinated community transportation available, affordable, and accessible

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### CTAA's philosophy

The CTAA members see mobility as a basic human right. Public transportation can equalize opportunity for people to:

- go to work
- seek training and education
- obtain medical care
- shop
- remain independent

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### ARTS Compendium

USDOT has developed the Advanced Rural Transportation System (ARTS) program. The program studies ways to best implement technologies that address transportation problems in rural areas.

The ARTS Compendium is an online information system used to track ARTS projects. Projects are categorized and can be sorted by an easy-to-use interface.

*Source: ARTS Compendium web site: <http://www.tfhrc.gov/its/newarts.htm>*

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## What Is Small Urban or Rural?, Continued

**Slide: Rural  
Market  
Segments**

### Rural Market Segments

- **Self-contained**
  - high growth
  - slow or no growth
- **Large sparsely populated**
- **Rural tourist areas**
- **Rural to metro communities**

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**Rural market  
segments**

The Advanced Rural Transportation Systems (ARTS) Program identified five rural market segments.

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## What Is Small Urban or Rural?, Continued

Rural Market Segments			
Description	Needs to provide...	Potential ITS applications	Example
<b>Self-contained high growth</b>			
<ul style="list-style-type: none"> <li>• service employment or retirement communities</li> <li>• economically prosperous residents</li> <li>• a high percent of trips to jobs</li> <li>• competition with autos for riders</li> </ul>	<ul style="list-style-type: none"> <li>• coordination among transportation providers</li> <li>• convenience for different types of trips</li> <li>• service enhancements to attract riders with other options</li> <li>• ability to support “welfare to work” programs (cooperative programs in which transit and public service agencies transport people to jobs)</li> </ul>	<ul style="list-style-type: none"> <li>• computer-aided dispatching (CAD)</li> <li>• automated passenger counting (APC)</li> <li>• fleet management systems</li> </ul>	<ul style="list-style-type: none"> <li>• Leesburg, VA</li> <li>• fixed route, demand response</li> </ul>
<b>Self-contained slow or no growth</b>			
<ul style="list-style-type: none"> <li>• an aging and/or declining population</li> <li>• a stagnant economy</li> <li>• high unemployment</li> <li>• high demand for social services</li> <li>• few transportation options</li> <li>• high numbers of transit dependent riders</li> </ul>	<ul style="list-style-type: none"> <li>• coordination with social service providers</li> <li>• automation of scheduling and routing</li> <li>• efficiency of record keeping and billing</li> </ul>	<ul style="list-style-type: none"> <li>• communication links to enhance flexibility</li> <li>• smart cards to aid in multiple agency billing</li> </ul>	<ul style="list-style-type: none"> <li>• Lima, OH</li> <li>• route deviation, demand response</li> </ul>

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## What Is Small Urban or Rural?, Continued

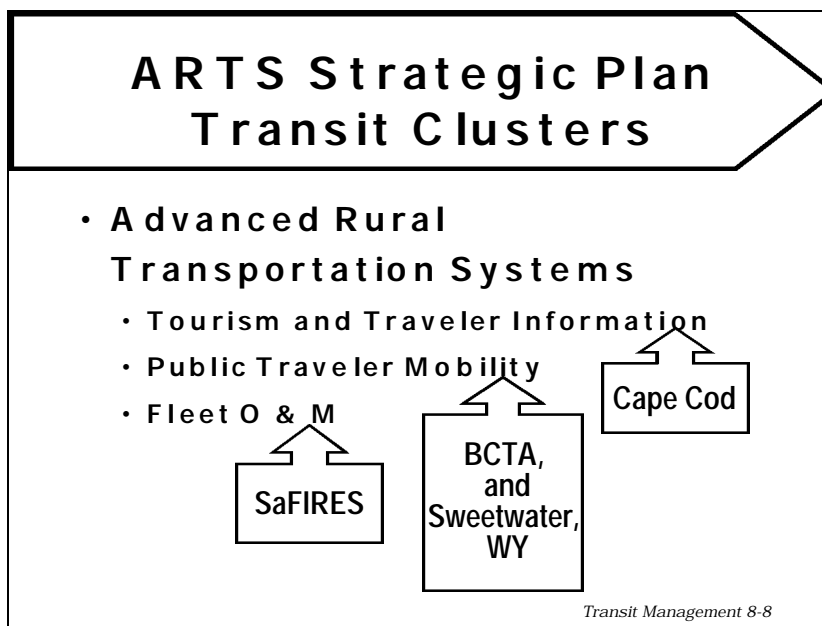
Rural Market Segments			
Description	Needs to provide...	Potential ITS applications	Example
Large sparsely populated			
<ul style="list-style-type: none"> <li>• low population density</li> <li>• low trip volume</li> <li>• long trip distances</li> </ul>	<ul style="list-style-type: none"> <li>• reliable communication links</li> <li>• coordination among distant service providers</li> <li>• emergency notification and response</li> </ul>	<ul style="list-style-type: none"> <li>• automatic vehicle location</li> <li>• emergency communications</li> <li>• smart cards to aid agency billing</li> </ul>	<ul style="list-style-type: none"> <li>• Sweet-water, WY</li> <li>• demand response fleet management</li> </ul>
Rural tourist areas			
<ul style="list-style-type: none"> <li>• a large seasonal variation of demand</li> <li>• congestion during peak tourist seasons</li> <li>• numerous small service providers</li> </ul>	<ul style="list-style-type: none"> <li>• efficient utilization of capital equipment</li> <li>• accommodation of both tourists and employees</li> <li>• information for customers unfamiliar with the service</li> <li>• safety prevention and response to hazardous conditions, e.g., ski resorts and bad weather</li> </ul>	<ul style="list-style-type: none"> <li>• traveler information systems</li> <li>• automated public address systems</li> <li>• mayday systems and other emergency systems</li> <li>• real-time speed warning systems for bus/truck on mountainous roads</li> </ul>	<ul style="list-style-type: none"> <li>• Front Royal, VA</li> <li>• Rideshare match, transfers</li> </ul>
Rural to metro			
<ul style="list-style-type: none"> <li>• long distance commutes through rural areas</li> <li>• routes from rural areas to metropolitan destinations</li> <li>• bedroom communities with strong metropolitan links</li> <li>• opportunities for high volume trips</li> </ul>	<ul style="list-style-type: none"> <li>• connection to urban transit systems</li> <li>• utilization of vehicles during off peak</li> <li>• high reliability and avoidance of traffic delays</li> </ul>	<ul style="list-style-type: none"> <li>• automated rideshare matching</li> <li>• dynamic vehicle routing</li> <li>• traveler information systems</li> </ul>	<ul style="list-style-type: none"> <li>• Cape Cod</li> <li>• automated transit information, fixed route</li> </ul>

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## What Is Small Urban or Rural?, Continued

Slide: ARTS  
Strategic Plan  
Transit Clusters



**ARTS strategic  
plan transit  
clusters**

The Advanced Rural Transportation Systems (ARTS) strategic plan has identified seven critical program areas, also known as transit clusters:

- Tourism and traveler information
- Public traveler/mobility
- Infrastructure O&M (operations and maintenance)
- Fleet O&M
- Emergency services
- CVO (commercial vehicle operations)
- Traveler safety and security

Of these, the three transit clusters listed on the slide relate to transit. Examples of each transit cluster are also shown. For more information, refer to the ITS ARTS Strategic Plan, August 1997 (U.S. DOT).

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## What Is Small Urban or Rural?, Continued

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### Tourism and traveler information

- Focus is on the needs of travelers in unfamiliar rural areas.
- Needs:
  - ◊ advisory information
  - ◊ transit information
  - ◊ business information
  - ◊ en-route services

An example of the tourism and traveler information transit cluster is Cape Cod, MA.

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### Public traveler mobility

- Focus is to reduce isolation and improve accessibility to key services for rural inhabitants.
- Needs:
  - ◊ advisory information
  - ◊ increase in trip time reliability
  - ◊ reduction of isolation
  - ◊ improvement of information and service

Two examples of the public traveler mobility transit cluster are BCTA in Beaver County, PA and Sweetwater, WY.

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### Fleet O&M

- Focus is on scheduling, routing, location, and maintenance of rural fleets.
- Needs:
  - ◊ fleet management
  - ◊ security
  - ◊ economic viability

An example of the fleet operations and maintenance transit cluster is SaFIRES with the Potomac and Rappahanock Transportation Commission.

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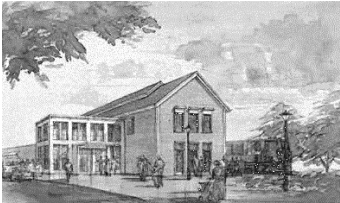


## Examples

Slide:  
Example

### Example

- Cape Cod Regional Transit Authority



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## Examples, Continued

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**Rural Tourist  
Area:  
Cape Cod, MA**

Cape Cod Regional Transit Authority (CCRTA) has begun a project called Rural Transit ITS Concepts Applied to Rural Tourist Economy.

According to the ARTS Compendium, the project includes:

- Tourism and travel information services
- Public traveler services/ public mobility services
- Fleet operations and maintenance

The purpose is to apply intermodal rural transit ITS concepts to Cape Cod and nearby islands of Martha's Vineyard and Nantucket.

Technologies include:

- Application of GPS-based AVL technology to intercity rail, bus, ferries, fixed route transit and paratransit systems
- Application of mobility management technologies (such as computer-assisted scheduling and dispatching, on-board data collection, and smart card technology) by local Cape Cod and Island providers
- Dissemination of real-time intermodal transit information through kiosks, hotel CCTV, public access TV, internet web sites, and telephone information

Phase I provided a 20 vehicle pilot program to introduce AVL technology into the current CCRTA fixed route and paratransit operations serving central Cape Cod. Phase II will expand to 100 vehicles which serve all of Cape Cod. Phases III and IV will install a similar 100-vehicle system in nearby Greater Attleboro—Taunton, MA.

Expected benefits include:

- improved service
- reduced congestion
- increased flexibility in service

*Source: APTS Compendium and News Release: Cape Cod Regional Transit Authority Awards Raytheon Transportation Management Solutions (TMS) Contract.*

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## Examples, Continued

Slide: Examples

### Examples

- BCTA  
Beaver County, PA



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## Examples, Continued

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**Rural/ small  
urban to metro:  
Beaver County,  
PA**

Beaver County Transit Authority (BCTA) serves an area right outside of Pittsburgh with a population of about 200,000.

BCTA has begun a Mobility Manager System (MMS) which is envisioned as a “one-stop shopping” travel agent, providing integrated travel services such as scheduling, routing, information and billing, service delivery using advanced telecommunications and vehicle location technologies.

- Service providers will be part of the MMS network through in-vehicle MDTs and vehicle location and transmitter/receiver devices.
- Users of the MMS service will access services via telephone, computer, or kiosk.

BCTA has completed phase 1: Planning and Development and phase 2: Design.

- Phase 3: Initial implementation, is awaiting funding.
  - Phase 4 will expand the service to include demand-responsive service.
  - Phase 5 will expand the service to a regional traveler information system, integrated with the Pennsylvania Dept. of Freeway Management System and the Pittsburgh Advanced Traffic Management System.
  - Phase 6 will integrate all previous phases and add a clearinghouse function that allows electronic fare payment and coordination with all service providers.
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## Examples, Continued

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**Welfare to Work: BCTA**

BCTA was chosen as one of three Pennsylvania transit authorities to advance employer transit partnerships. A concentrated focus will be welfare to work issues.

The purpose is to advance a partnership strategy for private-public transit. There are exciting opportunities for transit agency partnerships with large and small employers and with various employer types, ranging from manufacturing to the service sector. The project is designed to better understand the barriers to private sector participation and to establish steps to bring those barriers down.

The area has a diverse employer base with a growing service sector. Low unemployment rate and high job vacancy rates make it difficult for employers to fill jobs. In addition, employer locations outside of the urban core challenge BCTA to find innovative ways to serve employer needs. Public-private partnership opportunities are enabling former welfare recipients to enter the labor pool as public transit is beginning to provide transit to and from employer locations which match work schedules.

*Source: BCTA home page <http://www.bcta.com>*

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## Examples, Continued

Slide:  
Example

### Example

- Sweetwater, W Y



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**Rural: Large, sparsely populated area Sweetwater, WY**

Sweetwater, WY encompasses more than 10,000 square miles and is the 9<sup>th</sup> largest county in the U.S. The Sweetwater Transit Authority has successfully completed a project called Resources Computer Assisted Dispatching.

Accomplishments reported to the ARTS compendium include:

- computer assisted dispatching of paratransit significantly increased the number of riders that could be served
- same day ride requests were able to be accepted, which increased demand
- increased ridership resulted in reduced cost per passenger trip to the county

*Sources: ARTS Compendium and Sweetwater Economic Development Association (SWEDA) home page.*

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## Examples, Continued

**Example:**  
**SaFIRES**

### Example

- **SaFIRES**  
**Potomac and Rappahannock**  
**Transportation Commission**  
**VA**



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*Continued on next page*



## Examples, Continued

### Rural/Small Urban to metro example: SaFIRES

The Potomac and Rappahannock Transportation Commission (PRTC) has recently completed a project called Smart Flexroute Integrated Real-time Enhancement Systems (SaFIRES).

This project is categorized as Public Traveler Services/Public Mobility Services and as Fleet Operations and Maintenance by the ARTS Compendium.

The system provides smart vehicle service that includes:

- route-deviation, fixed route, and demand responsive service using a GPS AVL system
- real time “call intake” scheduling software
- silent alarm/cover microphone
- computer assisted dispatching
- GIS mapping
- digital communications through mobile data terminals (MDTs)

The test phase integrated route deviation, commuter rail and bus, feeder bus and human service transportation in a suburban to rural commute.

Deployment began with non-ITS enhanced operations in 1995. ITS operations began in the end of 1997.

Expected benefits from the application of ITS technologies include:

- same day reservations for flexroute (route deviation) service
- improved customer communication
- improved fleet tracking
- increased efficiency and ridership
- enhanced operating data and automated collection
- improved working environment
- capability of evaluating multiple travel mode itineraries

*Sources: ARTS Compendium and PRTC home page  
[http://www.omniride.com/its\\_project.htm](http://www.omniride.com/its_project.htm)*

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## Examples, Continued

### SaFIRES results

Results reported on the SaFIRE web page include:

- 1,150 trips per day
- 9.7 riders per revenue hour (range 6.0 to 14.5)
- \$3.32 cost per rider (range \$2.00 to \$6.14)
- compares favorably to mature peer systems (6.8 riders per hour, \$5.72 cost per rider)
- 68% use for work
  - ◊ 26% formerly drove alone to work
  - ◊ 6% couldn't make trip before
- 27% use for education
  - ◊ 10% couldn't make trip before
- 18% formerly drove alone to shop
- 83% comfortable with flexible aspect
- estimated annual savings versus fixed route **and** paratransit -- \$560,000, eight vehicles, 62 daily service hours (additional 50% expenditure to operate both systems)
- 83% rider approval rating (excellent/good service)
- 77% of residents said it was "easier to get around" versus 56% two years ago

*Source: SaFIRES web page*

### SaFIRES partnerships

SaFIRES is a public/private partnership that includes:

- FTA and FHWA
- GMSI, Inc (hardware and software) who works with Trapeze Software group
- ManTech Systems Solutions, Corp (technical manager of the overall project)
- Northern Virginia Planning District Commission (NVPDC) (local GIS mapping)
- PRTC
- SG Associates, Inc (operations manager and technical advice on transit system configuration for PRTC)
- Trapeze Software Group, Inc. (TSG) (computer-based scheduling and dispatch software)
- Virginia Department of Rail and Public Transportation (VDRPT)

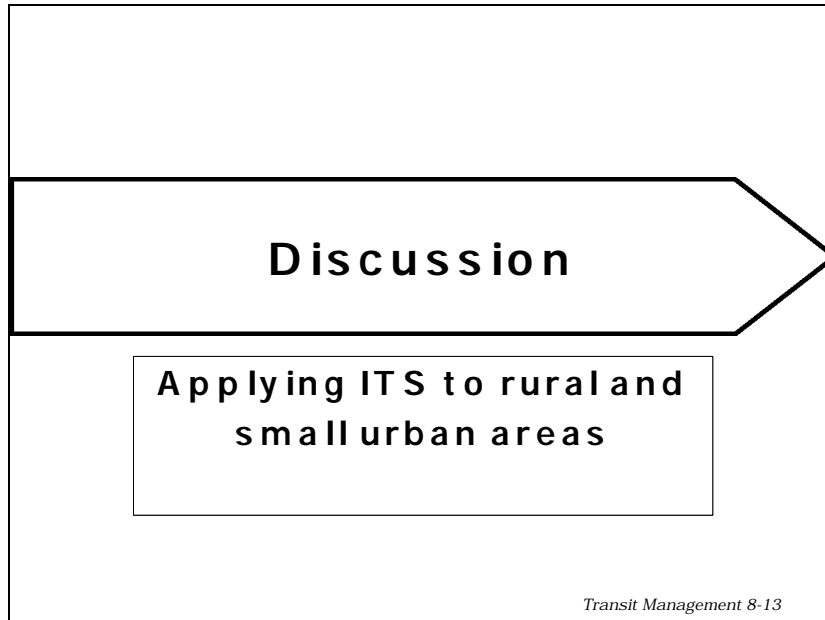
*Source: SaFIRES web page*

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## Examples, Continued

Slide:  
Discussion



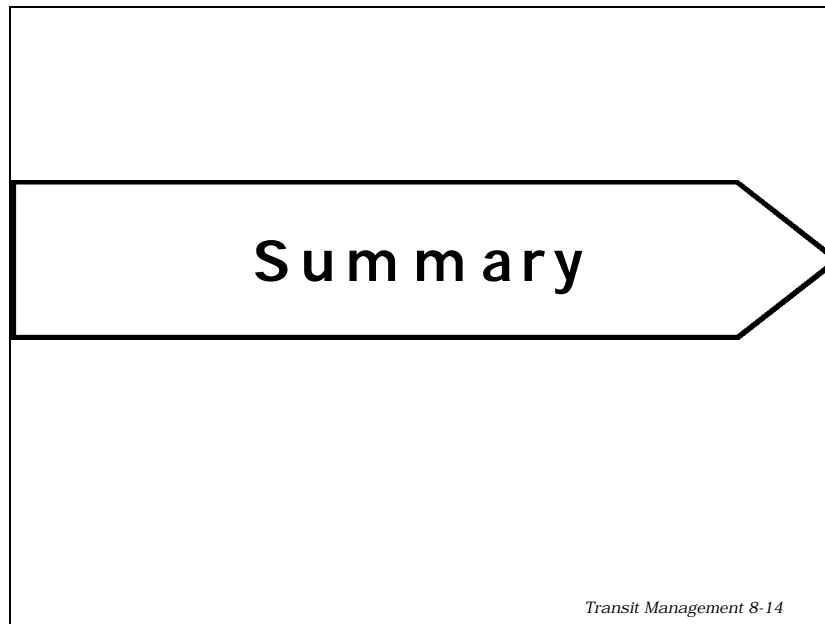
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## Examples, Continued

Slide:  
Summary



Transit Management Training Course	Title	ITS Professional Capacity Building		NTI course
		Technical Seminars	Short Courses	
<b>Module 8: Small Urban/ Rural</b>	<i>See also Module 6 and Module 5 listings.</i>			X
	Reinventing Transit: Using Information Technologies to Reinvent Transit Services			X
	Market Segmentation for Transit			X





## Exercise 8-1: Custom Course Notes

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**In this exercise**

You will:

- be able to describe the possible benefits of applying APTS technologies to your small urban or rural transit systems
- 

**Directions**

Read the three short examples of ATIS (Automated Traveler Information Systems) pre-trip Internet service and answer the questions that follow.

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## Exercise 8-1: Custom Course Notes, Continued

### Rural Internet

Nantucket, MA is a good example of how a small agency can provide basic information regarding fixed route pre-trip transit information via the Internet. Because Nantucket is a rural tourist area, the information they have put on the Internet can reach potential tourist customers, who may not know that the island has public transit.

The Nantucket Regional Transit Authority has linked their web information to the APTA web site ([www.apta.com](http://www.apta.com)) and is listed under Massachusetts transit agencies. The information they have provided is one “page” with no internal links. The information they provide is shown below.

Public Transportation on Nantucket Island
<p>The Nantucket Regional Transit Authority shuttle goes from one end of Nantucket to the other. The frequency of the shuttle and expanded routes make it even easier to leave your car at home when you visit the Island. Please enjoy Nantucket and remember that the shuttle is a safe and convenient mode of transportation and a way to help control traffic congestion. Be a part of the solution... catch the shuttle!</p> <p>Shuttle service runs from June 1st to September 30th from 7 a.m. to 11:30 p.m. All shuttle buses are handicap accessible and are equipped with bicycle racks. Paratransit service is available with 24 hour notice.</p> <p>Satellite parking areas are available along the routes. Designated shuttle stops are conveniently located along each route; look for the gray posts with red &amp; maroon stripes, making an NRTA Bus Stop. The South Loop runs every 10 minutes, fare 50¢; the Miacomet Loop runs every 20 minutes, fare 50¢; the Madaket Route runs every 30 minutes, fare \$1; and the ‘Sconset Route runs every 60 minutes, fare \$1. Routes and fares are subject to change. Senior citizens 65 and older and children 6 and under ride for free. Pass options are also available. Please call the NRTA office at 508-228-7025 for further information.</p>

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## Exercise 8-1: Custom Course Notes, Continued

### Small urban feeder service with stored value card

Public transportation in Plymouth, Minnesota includes a feeder service bus route to Minneapolis called Metrolink. Metrolink customers are small urban to metro commuters. Metrolink fares can be paid by a stored value fare card.

The information below is available from the APTA web page that links to Plymouth, Minnesota.

Plymouth, Minnesota
<p>Public bus service to/from downtown Minneapolis (Routes 91 &amp; 93). Arrive at work and home refreshed because Plymouth Metrolink buses travel the HOV (High Occupancy Vehicle) sane lanes. Cruise by the rush-hour traffic jams to/from the heart of the Minneapolis business district. We offer morning and evening routes. Catch the bus in your neighborhood, or at Park &amp; Ride lots (Co. Rd. 73/Hwy. 55 and at the Four Seasons Mall), or connect with Metro Transit regional transit service at the Plymouth Road Transit Center/I-394 Park &amp; Ride lot. Return shuttles leave this lot at 12:56 p.m. and 6:56 p.m.</p>
<p>Hours of Service Monday-Friday Plymouth pickups from 5:59-8:22 a.m. Downtown departures from 4:35-6:38 p.m. Times are convenient whether you start early or stay late. Plymouth Metrolink also participates in the Guaranteed Ride Home Program.</p>
<p>One-Way Fares \$2 cash \$1.80 - SuperSaver Stored Value Card \$76 - SuperSaver 31-Day Pass</p>
<p>Phone (612) 349-7000 for more information.</p>

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## Exercise 8-1: Custom Course Notes, Continued

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**Small urban  
commuter  
ridematch**

KITSAP Transit, in the Puget Sound area of Washington state, provides a nicely packaged Internet sign-up system for their commuter ridematching program. This is what they say about it:

- Looking for someone to share a ride with? We offer a **free** computerized ridematching service. This service will match you with other commuters that have similar work schedules and commute to the same general area. To find a ride match, complete this form. When you “submit it”, it will automatically be e-mailed to our Customer Service Office.

Visit the site online at [www.telebyte.com/kittrans](http://www.telebyte.com/kittrans)

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## Exercise 8-1: Custom Course Notes, Continued

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**Question 1**      How are these examples relevant to your transit system and your region?

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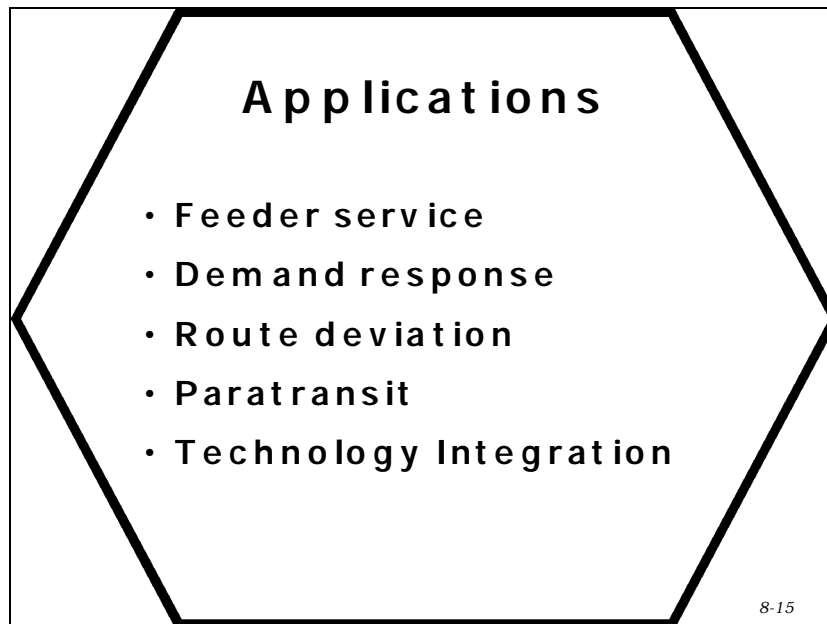
**Question 2**      List three benefits of using the Internet as an ATIS tool that these examples show.

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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies

Slide:  
Applications



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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

Slide: Small  
Urban & Rural  
Feeder Services

### Small Urban & Rural Feeder Services

- Feed other transit systems
  - rail, boat, or urban agencies
- Small to medium size fleet
- Short routes

*Transit Management 8-16*

**How feeder  
services work  
for small urban  
& rural systems**

Feeder services:

- feed other transit systems, such as
  - ◊ rail, bus, ferry, or other agencies

Characteristically, they:

- use small to medium size buses
- operate on short routes, preferably configured in a loop shape, that feed into other transit systems such as rail or boat

In rural areas, feeder service routes will be longer than in urban areas.

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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

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**Comparison to urban**

- Feeder services for an urban agency can include small to medium-sized fleets of downtown people movers (DPM) operating at low headways (space between vehicles) on short routes that can feed into other transit systems such as rail or boat.
- Rural feeder services originate from small communities and feed into routes provided by larger agencies.
  - ◊ An example is Beaver County Transit (BCTA) which takes residents from small communities and links to Pittsburgh's PAT service and the airport.
- Small urban feeder services can provide a fast and direct connection to major centers located outside an urbanized downtown area such as:
  - ◊ universities
  - ◊ shopping centers
  - ◊ airports
  - ◊ hospitals
- Feeder services in general, can be a way of restructuring the existing bus network for the purpose of achieving a more efficient and a better integrated multimodal system.
  - ◊ They are most effective in serving dense residential areas located near the Central Business District (CBD) as well as corridors identified as natural extensions to the rail system.

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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

Slide: State-of-the-Art Applications

### State-of-the-Art Applications

- Traveler information
- Fare payment
- Fleet management



*Transit Management 8-17*

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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

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**Feeder services advantages**

Feeder services:

- provide fast and direct connections between major centers
  - provide connections to larger transit system routes which enable transportation opportunities for a greater segment of the population and increase customer satisfaction
    - ◊ work to essentially expand area covered by transit (take advantage of other transit agency options)
  - create multimodal links over large areas by serving in corridors identified as natural extensions of the rail system
  - are more customer oriented – more emphasis on service
  - increase safety if the customer can be at a pickup location (possible danger point) no longer than necessary (similar to demand response)
- 

**Feeder services disadvantages**

The disadvantages of feeder services may include:

- possibility of aggravating customers if the route gets behind schedule
    - ◊ missing connections
  - policies would need to be determined
    - ◊ whether to charge customer or not
  - counts as two rides if you are switching to another mode
  - may not be as fast and direct as other modes of transportation
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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

Slide: Small  
Urban and  
Rural Demand  
Response

### Small Urban & Rural Demand Response

- Non-fixed-route
- Pre-arranged pick-up/drop-off
- Flexible within service area
- Paratransit



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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

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### Demand response

Demand response:

- non-fixed route
  - ◊ common pickup points are sometimes used
  - ◊ stops at someone's home if the person has requested a ride
- pre-arranged pick-up/drop-off
  - ◊ typically picks up passengers at home for the initial trip, and drops them at their destination, rather than at a bus stop
- uses advanced scheduling, which includes:
  - ◊ pickup and drop-off sequences generated on an "as-needed" basis by the dispatch center according to the actual passenger requests
  - ◊ pooling of similar trip requests
  - ◊ assignment of optimal route
  - ◊ total distance of vehicle run
  - ◊ operating within certain travel time parameters for passengers (attempts to minimize travel time)
- flexible within service area
  - ◊ allows many trips to be scheduled on a routine basis, so the rider does not need to phone in daily
  - ◊ accommodates same-day service, wherever possible
- paratransit service is one form of demand response service, and most widely used

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### Demand response vs. fixed route service

Fixed route service does not always meet the needs of small cities with low population densities and high automobile usage.

- Large cities also use demand response to serve areas that are not served by fixed bus routes.

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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

Slide: Services

### Services

- Demand response
- Route deviation
- Paratransit



*Transit Management 8-19*

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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

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- Route deviation** Flexibly-routed service is typically provided by route deviation schemes (route deviation, checkpoint, point deviation, and other innovative services), in which vehicles leave a fixed route, called a “trunk route,” for a short distance to pick up or discharge passengers. This is another way of improving service. All vehicles service the trunk route, and vehicles leave the route depending on actual passenger demand.
- Route deviation provides flexible routes to offer more convenient customer service.
    - ◊ some routes deviate to fixed points
  - Computer-aided dispatch is the technology that makes this application possible.

Typical vehicles used in route deviation include:

- small buses
- taxicabs
- vans
- other small, shared ride vehicles

This service may provide some door-to-door service, but does expand transit coverage to lesser populated locations and neighborhoods.

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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

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### How CAD makes flexible routing possible

Route deviation has become economically feasible because of the technology of computer-aided dispatch (CAD)

- Service can be provided or expanded because of CAD.
  - In low-density areas, this makes transit available to more people in a wider geographic area.
  - Because CAD enables the selection of the closest transit vehicle to respond to the customer, route deviation allows expanded route coverage with minimal disruption in vehicle headways.
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### Paratransit demand response and the Americans with Disabilities Act

The Americans with Disabilities Act (ADA) requires that public transit operators provide door-to-door paratransit service to eligible individuals within the service area of fixed route transit who are unable to ride the fixed route buses or trains via demand response service. Also:

- The mandate to provide mobility to the disabled is seen as a central mission of public transportation.
  - Some disabilities may prevent a person from riding a regular transit vehicle altogether, other disabilities may present an obstacle only under certain circumstances (such as temperature, precipitation, darkness, or ground conditions).
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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

Slide: State-of-the-Art: Mobile Data Terminals

### State of the Art: Mobile Data Terminals

- On-board computer
- 2 way communication
- Traveler information
- Advanced communications

*Transit Management 8-20*

**State-of-the-art:  
Mobile Data  
Terminals**

Mobile Data Terminals (MDTs) are on-board computers that provide two-way communication between the operator and the dispatcher.

- The MDT displays instructions to the vehicle operator showing the next stops to make.
- Trip requests can be accepted while the vehicle is moving.
  - ◊ For example, a passenger boards at a fixed stop and requests drop-off at an on-demand stop.

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## Appendix: Innovative Applications of ITS for Rural Transit Service Strategies, Continued

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**Demand response advantages**

Demand response transit can be an extremely effective service for many communities.

- Demand response is expensive in urban areas; however, the cost per trip operating in low-density communities is more economically feasible, and is close to that of fixed route systems.

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**Flexible routing: advantages**

Route deviation can provide transportation at a lower cost and with greater convenience than conventional fixed route transit.

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**Demand response: advantages**

The two important advantages of demand response service which make it an attractive mode of transit in small cities, rural areas, suburbs, and low-density neighborhoods of large cities are:

- Demand response transit can reach farther than a fixed route transit system.
- Demand response service can be made very accessible to persons with disabilities – people who depend upon public transportation.

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**Demand response disadvantages**

Demand response trips can cost more than fixed route trips, except in low-density areas, where the cost per trip for demand response is close to that of fixed route systems.

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